

# QUEST

ADVENTURES IN THE WORLD OF SCIENCE

## SCIENCE OF SPORT II

# 38

### FACT FILES ON:

- ▶ Pitstop technology
- ▶ Contact sports
- ▶ Freestyle skiing skills
- ▶ Marksmanship
- ▶ Speed cycles
- ▶ Power throws

**GIANT  
ICE HOCKEY  
POSTER**

**THREE PROJECTS**

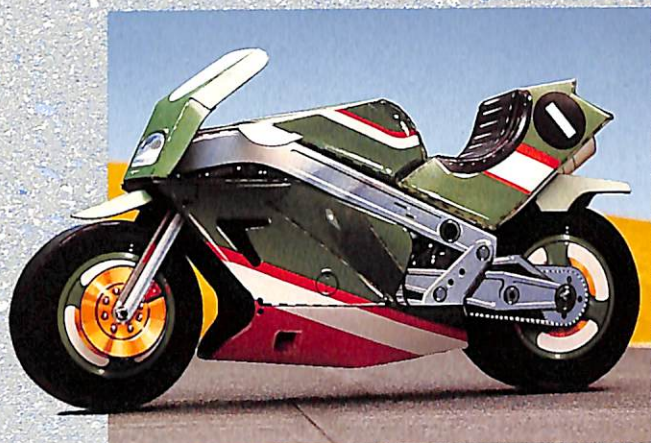
**MODEL:  
RACING MOTORBIKE**



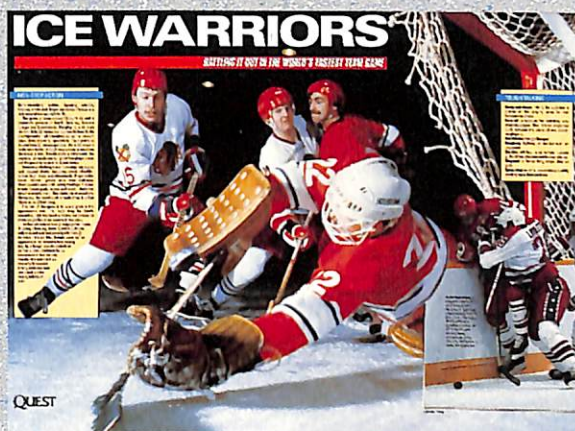
# INSIDE THIS PACK

## FACT FILES

- ▶ Target practice ▶ Ski runs ▶ Protective gear
- ▶ The hunt ▶ Pit mechanics in action
- ▶ Archery ▶ Bobsleigh racing ▶ High-tech measuring and timing devices



**MODEL** Kawasaki ZXR2

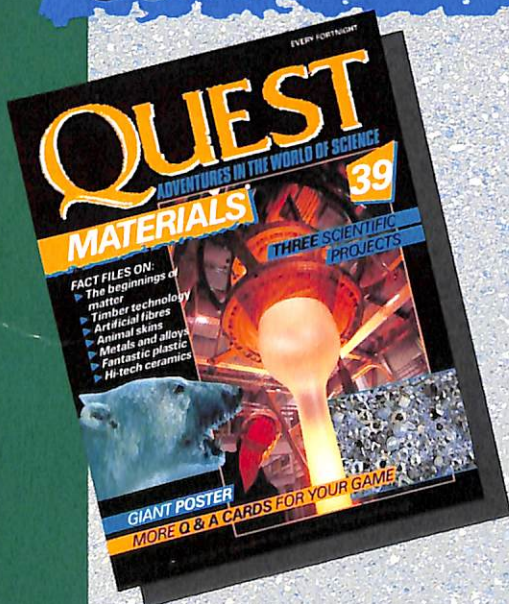


**POSTER**  
Ice Warriors

**THREE  
SCIENTIFIC  
PROJECTS**



## COMING IN QUEST 39 MATERIALS

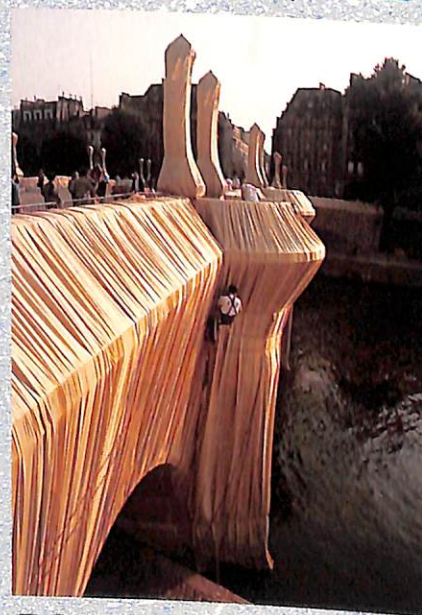


## FACT FILES

- ▶ Ceramic engines
- ▶ Malleable plastics
- ▶ Animal skins
- ▶ Semiconductors
- ▶ Artificial elements
- ▶ Metal alloys
- ▶ Sawmills



**More Q&A cards**



**POSTER**  
Christo's  
material  
projects

ISSN 1350-3766







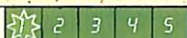
# PROJECTS

## SCIENCE OF SPORT II

Simon Critchley

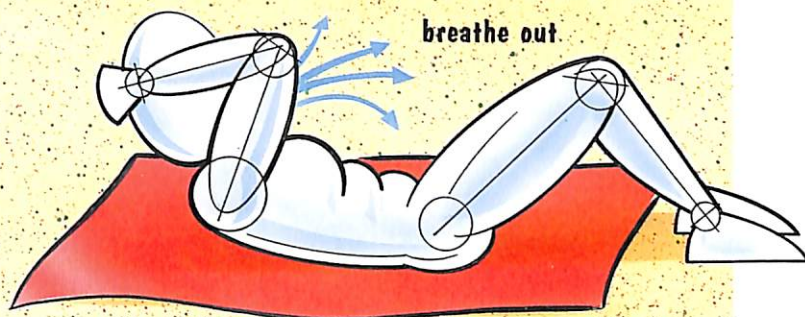
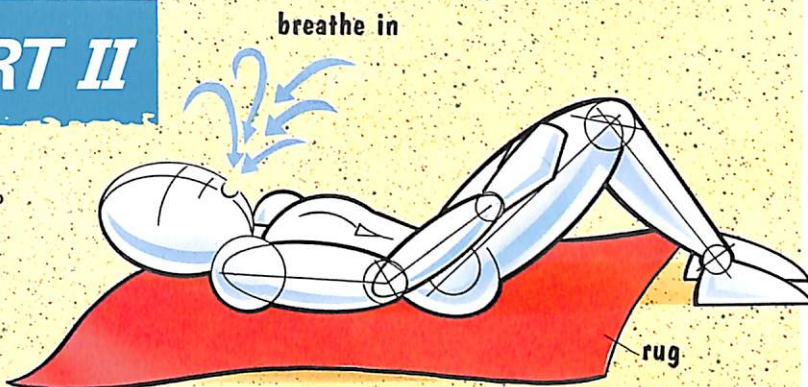
Training involves repetition of exercise to improve performance.

### CURL-UPS



Strengthen a set of important muscles by regular training.

Dress in loose clothing and lie on a carpeted floor with your legs hip width apart and knees bent. Place your fingertips behind your ears as shown and pull your navel down towards your spine. Breathe in. As you breathe out, tuck your chin in and curl your head and shoulders off the floor towards your thighs. Breathing in, slowly lower back down. Repeat every day, doing the whole movement 10 times to start and gradually increasing the number as your muscles get stronger. Never hold your breath and avoid doing the exercise too soon after you have eaten.



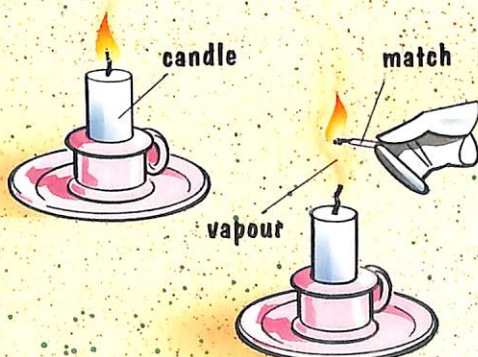
### AIR PHENOMENA

It is all too easy to forget the air around us as we are so accustomed to it. However, air is a mixture of gases, mainly oxygen and nitrogen, with its own properties, as shown by these two experiments.

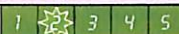
### RELIGHT A CANDLE



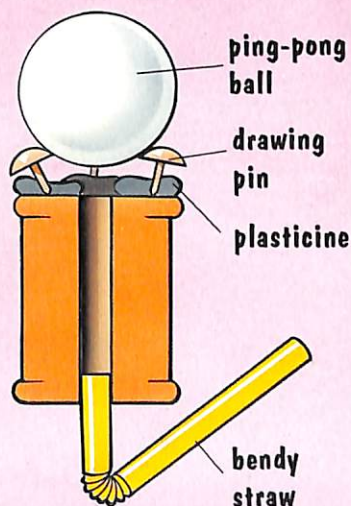
You will need a household candle, a candlestick and a match. First make sure that the candle is secure by placing it firmly in the candlestick. Strike the match and light the candle. After letting it burn for a few moments, blow the candle out. Now, strike another match and hold it in the vapour just above the wick as shown. You will find that the candle will relight because the vapour contains inflammable fatty acids, resulting from impurities in the candle itself or the chemical treatment of the wick.



### HOVERING BALL



You need a cotton reel, some plasticine, four small tacks, a wide, bendy, drinking straw and a ping-pong ball. Place the plasticine on one end of the cotton reel, leaving the hole clear. Push the tacks into the plasticine as shown, then put the straw into the hole at the other end. Balance the ping-pong ball on the tacks and blow through the straw. The ball will hover in mid-air. This is the principle of hovercraft.



### PROJECT INFORMATION

Each QUEST project and model has its own difficulty rating: 1 very simple, 2 simple, 3 intermediate, 4 advanced, 5 complicated

Every care has been taken to ensure projects are as safe as possible. However, parents should supervise all projects. The publisher can accept no liability for injury.

**WARNING!**





# MODEL

## ASSEMBLY INSTRUCTIONS

1 2 3 4 5

### You will need

Scissors • Ruler • Craft knife • Glue •  
Two cocktail sticks

Before cutting out the pieces, score along all broken lines with a blunt edge and ruler to make folding and gluing easier. Study the ASSEMBLY DIAGRAM to see how the pieces fit together, and use the dotted lines as a guide for positioning.

NB Younger children will need supervision when using a craft knife.

### To make up

#### Motor bike body

**1** Cut out frame **A**. Using craft knife, make small holes at centre of two crosses on **A**. Fold **A** to shape and glue. Cut out underside **B** and glue to tabs on **A** (see ASSEMBLY DIAGRAM).

**2** Cut out fuel tank **C** and glue to shape. Cut out seat **D**, fold down tabs and glue to shape. Glue tabs on rear end of **C** to front of **D** and then glue **C** and **D** to **A** (see ASSEMBLY DIAGRAM).

**3** Cut out fairings **E**, fold and glue to shape. Cut out windscreen, headlight and fairing

# KAWASAKI

## ZXR2



**F**, cut along solid lines to make two small slits, then stick slits down to create slight curve in windscreen. Fold **F** to shape and glue flaps to inside of **E**, following dotted positioning marks.

**4** To glue **E** to **A**, squeeze strip of glue just above bottom edges of both sides of **A**, then hold **E** in position (see ASSEMBLY DIAGRAM) until glue has dried. Glue **F** to

**A** by gluing inside of headlight to sloping panel at top front end of **A**.

**5** Cut out handlebars **G** and glue to panel on **A** (see ASSEMBLY DIAGRAM). Cut out rear mudguard **H** and glue to back of **D**, following positioning marks.

**6** Form exhaust pipe **I** into tube shape and glue. Fold tab back, find positioning dots on **A**, then glue tab to **A**. If necessary, glue side of **I** into position on side of **H**.

**7** Cut out front mudguard **J**, fold along broken line, cut slits and glue slight fold into position to make gentle curve. Spread glue on upper side of tabs and glue to **B**, following positioning marks.

### Wheels

NB Make a small hole, using a craft knife, at the centre of the cross on each wheel part.

**1** Cut out stanchions and wheel discs **K** and **L**. Fold tab on **K** inwards and spread glue on upper surface. Stick to underside of tab on **J** that is already glued to **B**. Repeat with **L**, so that stanchions are positioned either side of front mudguard.

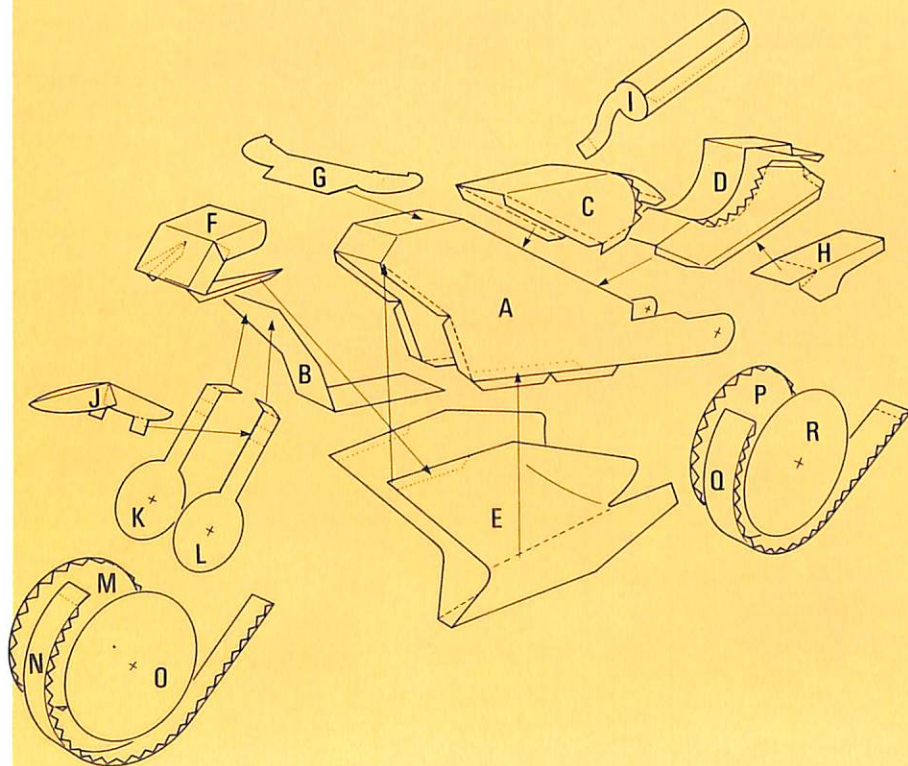
**2** Cut out front wheel parts **M**, **N** and **O**. Fold down tabs on **M**, spread glue on tabs, then wrap **N** around **M**. Stick other side of wheel **O** to folded down tabs on **N**.

**3** Repeat with wheel parts **P**, **Q** and **R** to make up rear wheel.

### To finish

**1** Position front wheel between **K** and **L**. Push cocktail stick through **K**, then both sides of wheel, then **L**. Trim stick.

**2** Place rear wheel between cantilever arms on **A**. Push cocktail stick through one cantilever arm, both sides of wheel and other arm. Trim stick.







# PROJECTS

## SCIENCE OF SPORT II

Simon Critchley

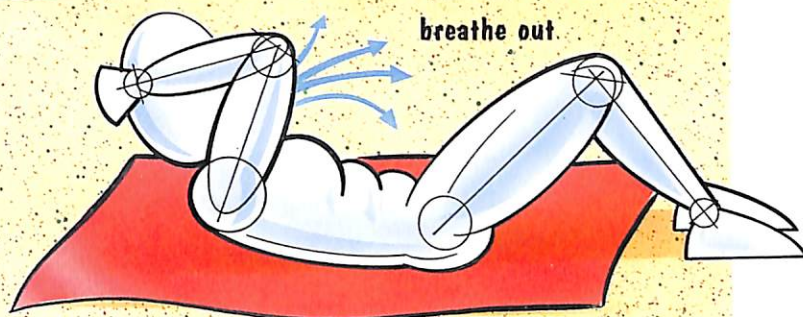
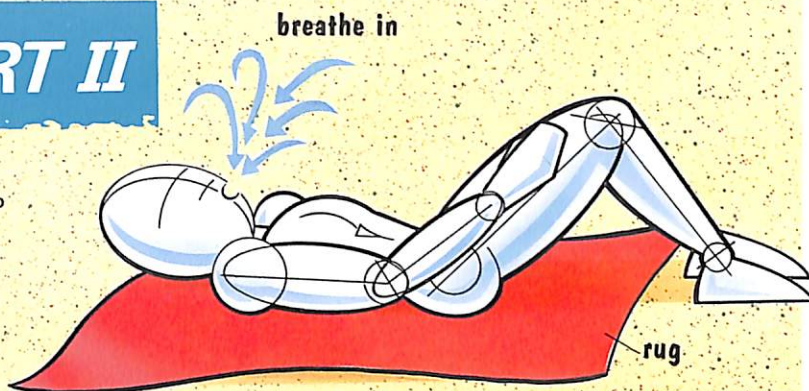
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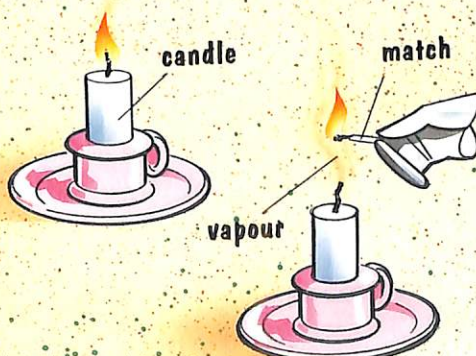
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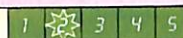
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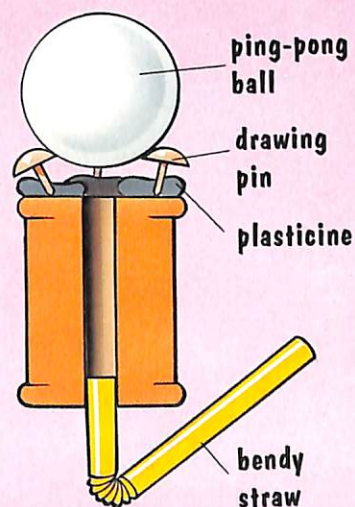
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# ICE WARRIOR

BATTLING IT OUT IN THE WORLD

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## NON-STOP ACTION

Bone-crunching tackles, lightning attacks, flashing shots and desperate saves – these are just some of ice hockey's thrills.

The game is played in over 30 countries, and is extremely popular in North America, Eastern Europe and Scandinavia. The playing area is an ice rink 56 by 26 metres surrounded by boards 115 cm high and a high plexiglass screen to prevent stray shots maiming spectators. Each game is divided into 20-minute periods. Up to 20 players make up a team – though only six are allowed on the ice at a time. Substitutions are frequent: the physical demands are so great few players can last the pace for more than two minutes.

Protective clothing is worn under jersey, socks and padded shorts, including chest, shoulder, elbow, thigh, knee and shin guards. Players also wear padded gloves with steel-reinforced thumbs and skates with safety heel tips. The net minder wears pads, helmet and mask – shots can travel at over 80 km/h. The sticks are of wood and fibreglass; the round puck is made of hard rubber 7.6 cm wide, 2.5 cm deep.

The aim of the game is to score goals in the opposition's net. The puck may be briefly controlled with the hand or skate, but passes or shots on goal must be made with the stick.

Ice hockey can be a very rough game indeed. Tripping, elbowing, slashing or fisticuffs are only classed as minor penalty offences (2 minutes in the sin-bin), though 'spearing' an opponent or persistent rule-breaking results in longer penalty periods or an 'early bath'. But brute force never won an ice-hockey match – the game is truly one of split-second timing, intricate team work and breath-taking individual skill.

Tony Stone Photo Library, London

QUEST



# DRS

WORLD'S FASTEST TEAM GAME

## TOUGH TALKING

**Dump and chase:** hitting the puck into a corner of the playing area for the forwards to chase.

**Face-off:** procedure for restarting play after stoppages. The referee drops the puck between the sticks of two opposing players.

**Net Minder:** the goalkeeper.

**Roughing:** fighting on the ice with an opponent.

**Sin-bin:** off-field area where players guilty of foul play are sent by the referee.

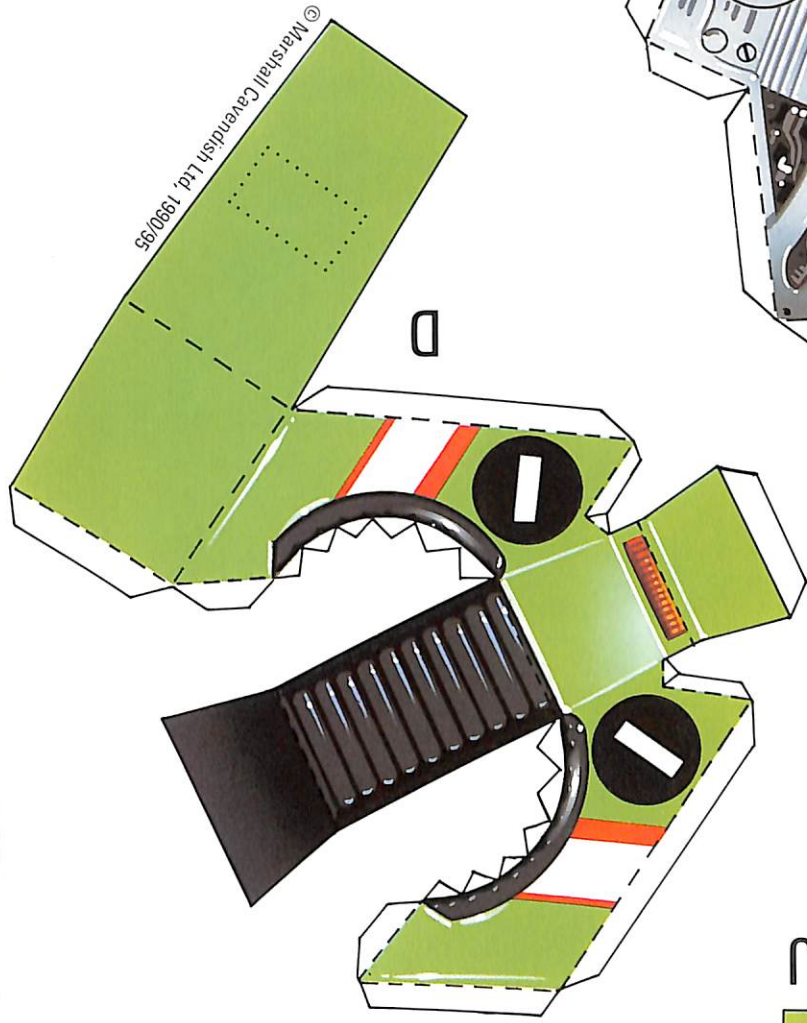
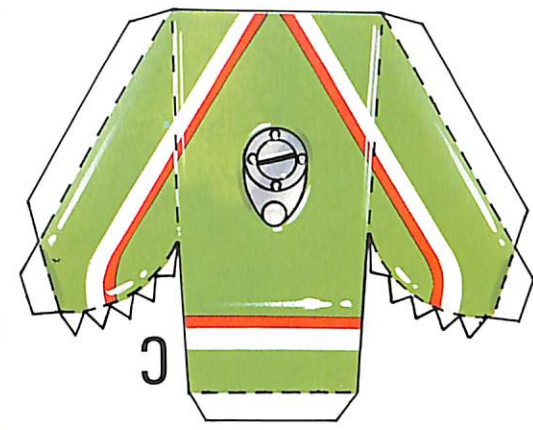
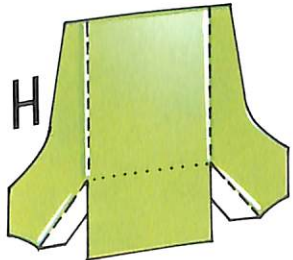
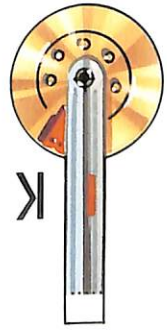
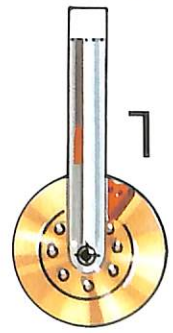
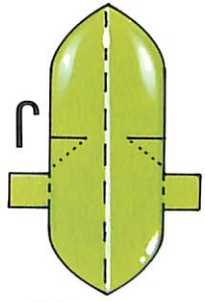
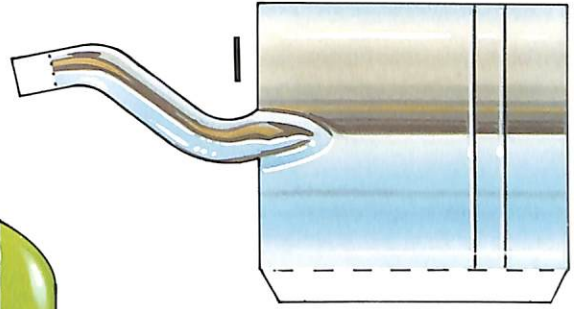
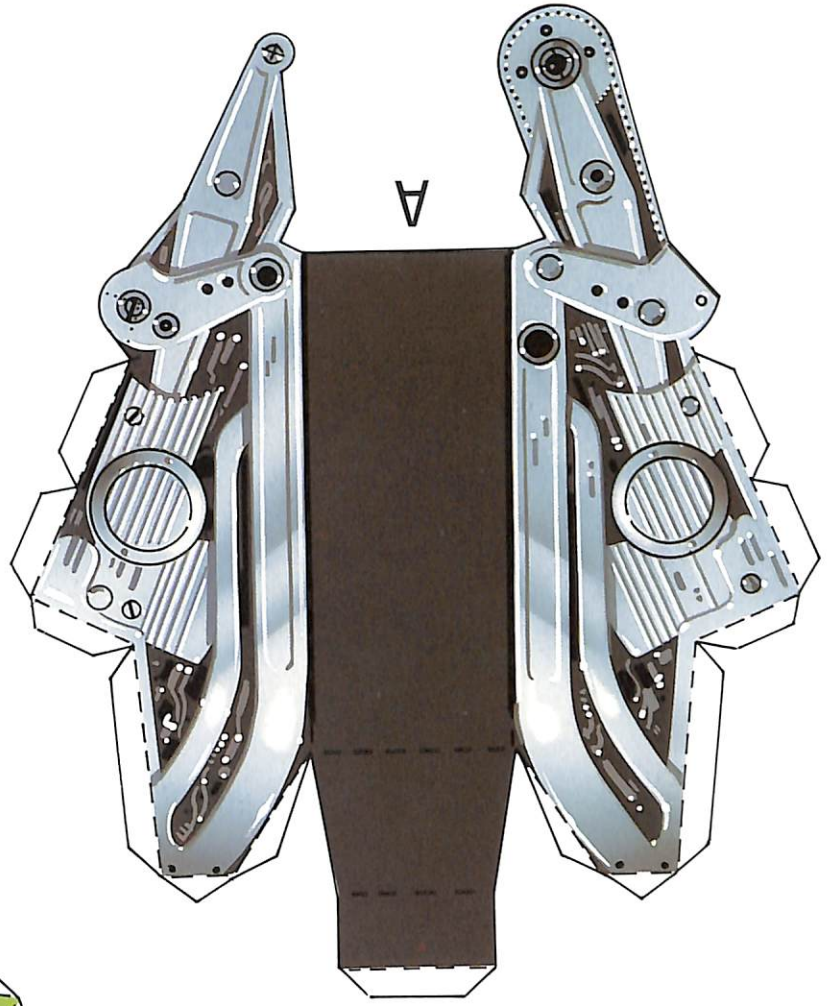
**Slapshot:** a fierce, long-range shot on goal.

**Spray stop:** when a player stops quickly, sending up a shower of ice.

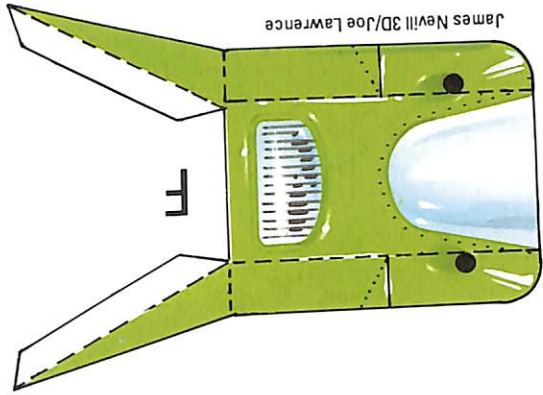
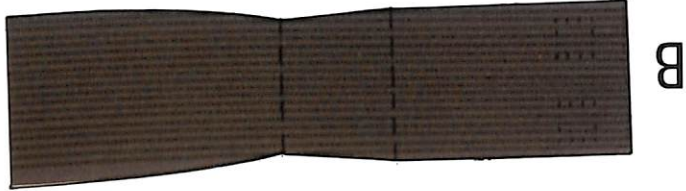
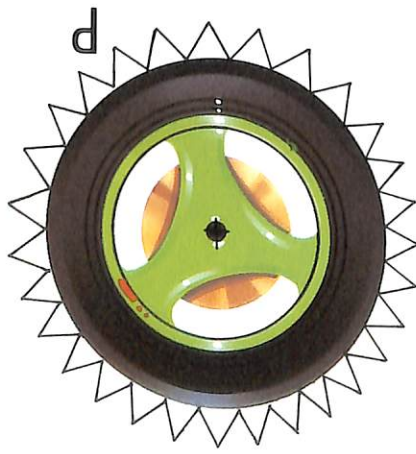
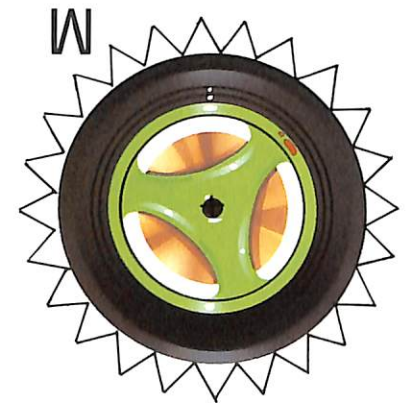
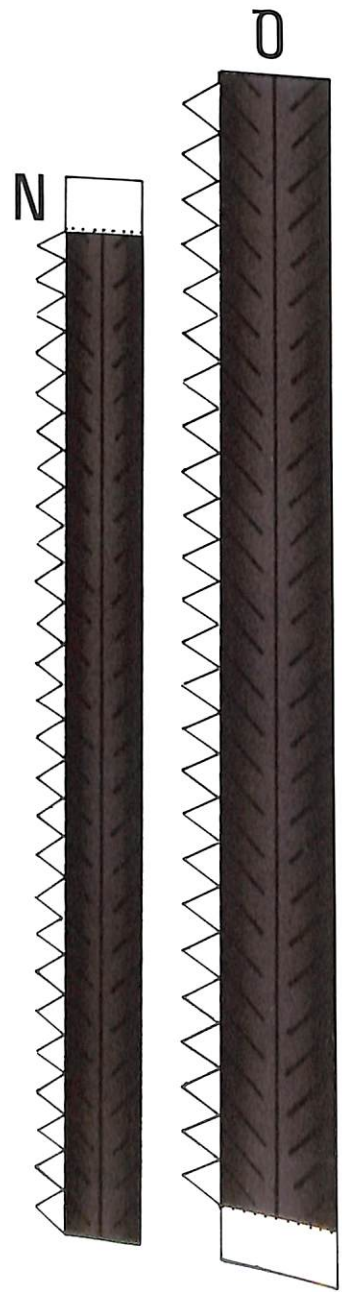
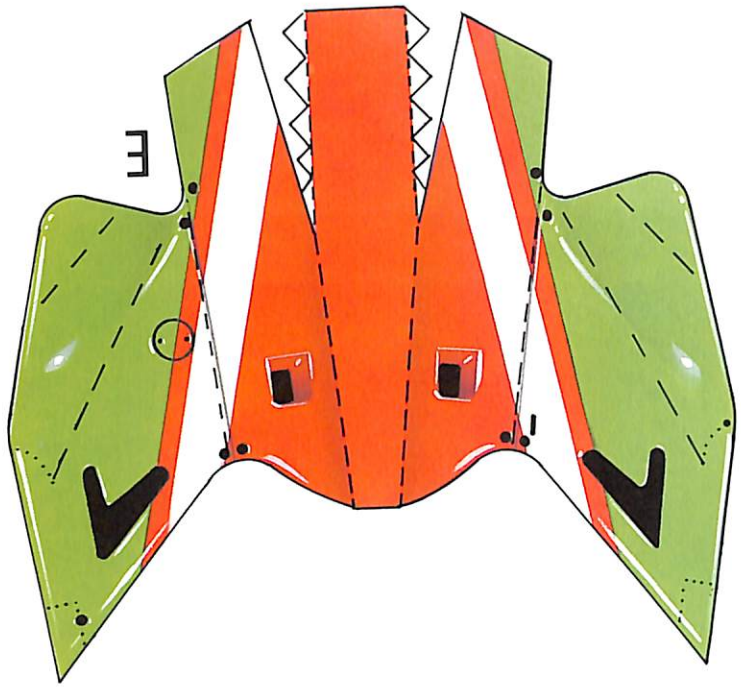
*In the heat of play a player in control of the puck may be sent flying by an opposing player skating into him (known as checking). As players crash together, tempers can flare. Top players try to escape being checked by using their skill and speed to outwit the opposition.*



# KAWASAKI ZX-R2



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James Nevill 3D/ Joe Lawrence